



FCC Test Report

APPLICANT : Ubiquiti Networks, Inc.
EQUIPMENT : UniFi® VoIP Phone X
BRAND NAME : UBIQUITI
MODEL NAME : UVP-X
FCC ID : SWX-UVPX
STANDARD : FCC 47 CFR FCC Part 15 Subpart B
CLASSIFICATION : Certification

The product was received on Jan. 22, 2016 and testing was completed on Mar. 04, 2016. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2014 and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Louis Wu / Manager

Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

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FCC ID : SWX-UVPX

Page Number : 1 of 19

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SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.107	AC Conducted Emission	< 15.107 limits	PASS	Under limit 4.80 dB at 0.526 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 1.20 dB at 39.99 MHz

1. General Description

1.1. Applicant

Ubiquiti Networks, Inc.

12F, No. 105, Song Ren Rd., SinYi District, Taipei 110, Taiwan

1.2. Manufacturer

Ubiquiti Networks, Inc.

12F, No. 105, Song Ren Rd., SinYi District, Taipei 110, Taiwan

1.3. Product Feature of Equipment Under Test

Product Feature	
Equipment	UniFi® VoIP Phone X
Brand Name	UBIQUITI
Model Name	UVP-X
FCC ID	SWX-UVPX
EUT supports Radios application	WLAN 11b/g/n HT20/HT40 Bluetooth v4.0 EDR/LE
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4. Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	802.11b/g/n: 2412 MHz ~ 2462 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Rx Frequency	802.11b/g/n: 2412 MHz ~ 2462 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Antenna Type	WLAN : PCB Antenna Bluetooth : PCB Antenna
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) Bluetooth LE : GFSK Bluetooth (1Mbps) : GFSK Bluetooth (2Mbps) : $\pi/4$ -DQPSK Bluetooth (3Mbps) : 8-DPSK

1.5. Modification of EUT

No modifications are made to the EUT during all test items.



1.6. Test Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1022 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.	
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	Sporton Site No.	
	CO05-HY	03CH06-HY

1.7. Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC 47 CFR FCC Part 15 Subpart B
- ANSI C63.4-2014

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.



2. Test Configuration of Equipment Under Test

2.1. Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

Frequency range investigated: conduction (150 kHz to 30 MHz), radiation (30MHz to the 5th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

The following tables are showing the test modes as the worst cases and recorded in this report.

Item	EUT Configuration	Test Condition		
		EMI AC	EMI RE<1G	EMI RE≥1G
1.	Charging Mode (EUT with PoE adapter)	☒	☒	☒
2.	Data application transferred mode (EUT with notebook)	☒	☒	☒

Abbreviations:

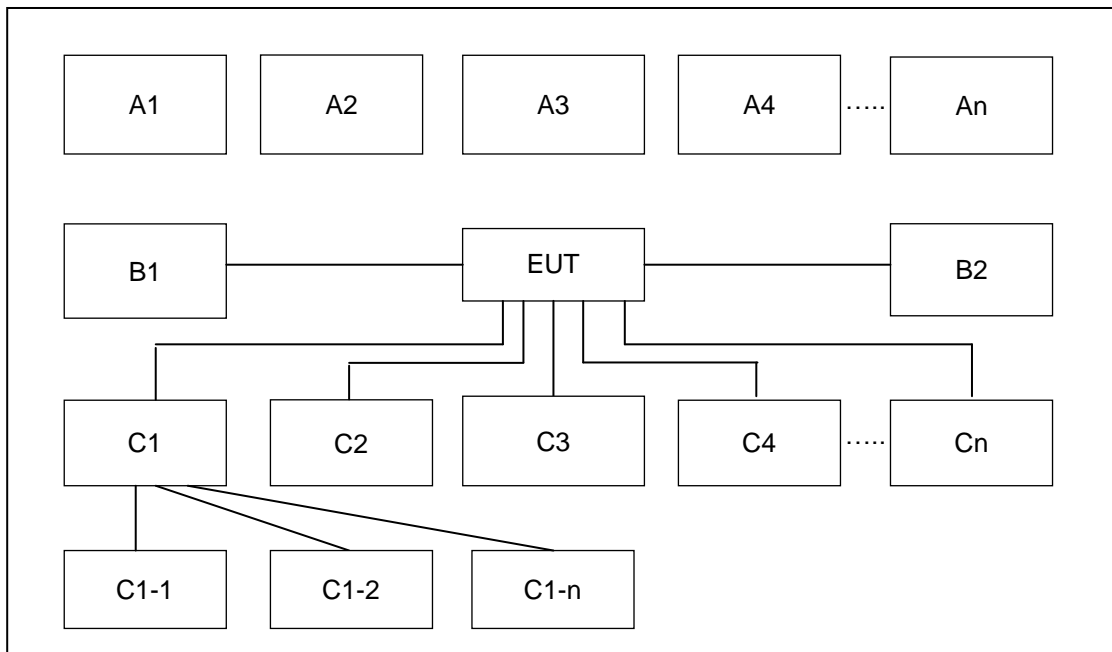
- EMI AC: AC conducted emissions
- EMI RE ≥ 1G: EUT radiated emissions ≥ 1GHz
- EMI RE < 1G: EUT radiated emissions < 1GHz

Test Items	EUT Configure Mode	Function Type
AC Conducted Emission	1/2	Mode 1 : Bluetooth Idle + WLAN Idle + LAN Link + PoE Link + USB Cable (Data Link with Notebook) + Earphone + VOIP Mode 2 : Bluetooth Idle + WLAN Idle + LAN Link + PoE Link + USB Cable (Data Link with Notebook) + Earphone + MPEG4
Radiated Emissions < 1GHz	1/2	Mode 1 : Bluetooth Idle + WLAN Idle + LAN Link + PoE Link + USB Cable (Data Link with Notebook) + Earphone + VOIP Mode 2 : Bluetooth Idle + WLAN Idle + LAN Link + PoE Link + USB Cable (Data Link with Notebook) + Earphone + MPEG4
Radiated Emissions ≥ 1GHz	1/2	Mode 1 : Bluetooth Idle + WLAN Idle + LAN Link + PoE Link + USB Cable (Data Link with Notebook) + Earphone + MPEG4

Remark:

1. The worst case of AC is mode 2; only the test data of this mode was reported.
2. The worst case of RE < 1G is mode 2; only the test data of this mode was reported.
3. Data Link with Notebook means data application transferred mode between EUT and Notebook.

2.2. Connection Diagram of Test System



Test Setup									
No.	Wireless Station	Connection Type	Test Mode						
			1	2	-	-	-	-	-
A1	Bluetooth Earphone	Bluetooth	X	X					
A2	WLAN AP	WiFi	X	X					
No.	Setup Peripherals	Connection Type	1	2	-	-	-	-	-
C1	PoE	RJ45 Cable	X	X					
C1-1	WLAN AP	RJ-45 Cable	X	X					
C1-1-1	Notebook	RJ-45 Cable to C1	X	X					
C1-1-2	VOIP Phone	RJ-45 Cable to C1	X	X					
C2	Notebook	RJ-45 Cable to EUT And USB cable to EUT	X	X					
C2-1	LCD Monitor	RJ-45 Cable to C1	X	X					
C2-2	iPod	USB cable	X	X					
C3	iPod Earphone	Earphone jack	X	X					

2.3. Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
2.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
3.	Notebook	DELL	P20G	FCC DoC/ Contains FCC ID: QDS-BRCM1051	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	LCD Monitor	DELL	U2410	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
6.	iPod	Apple	A1199	FCC DoC	Shielded, 1.0 m	N/A
7.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
8.	iPod Earphone	Apple	N/A	Verification	Unshielded, 1.0 m	N/A
9.	PoE adapter	UBIQUITI	GP-H480-050G	N/A	N/A	N/A

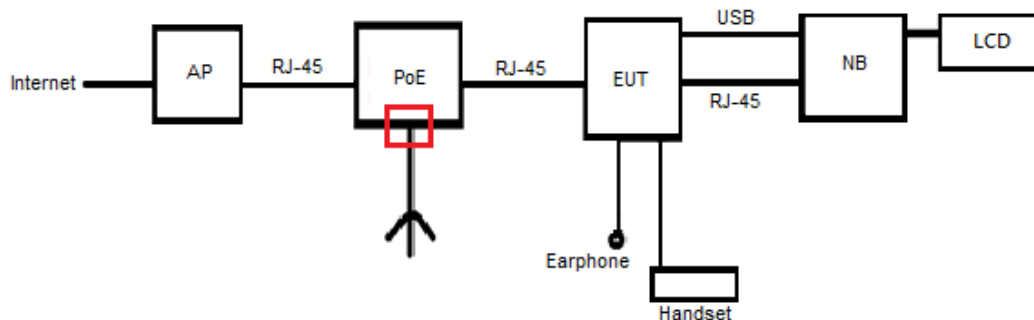
2.4. EUT Operation Test Setup

The EUT was connected to the earphone and PoE adapter, and PoE adapter was connected with AP. Another VOIP phone and PoE adapter the same as above setting are also connected with AP. Let both VOIP phones could be established a phone call.

At the same time, he EUT was attached to the Bluetooth earphone or WLAN AP, and the following programs installed in the EUT were programmed during the test.

1. Data application is transferred between Laptop and EUT via USB cable.
2. Execute "Video Player" to play MPEG4 files.
3. EUT links with Notebook and execute ping.

Setup illustration is shown as below:





3. Test Result

3.1. Test of AC Conducted Emission Measurement

3.1.1 Limits of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

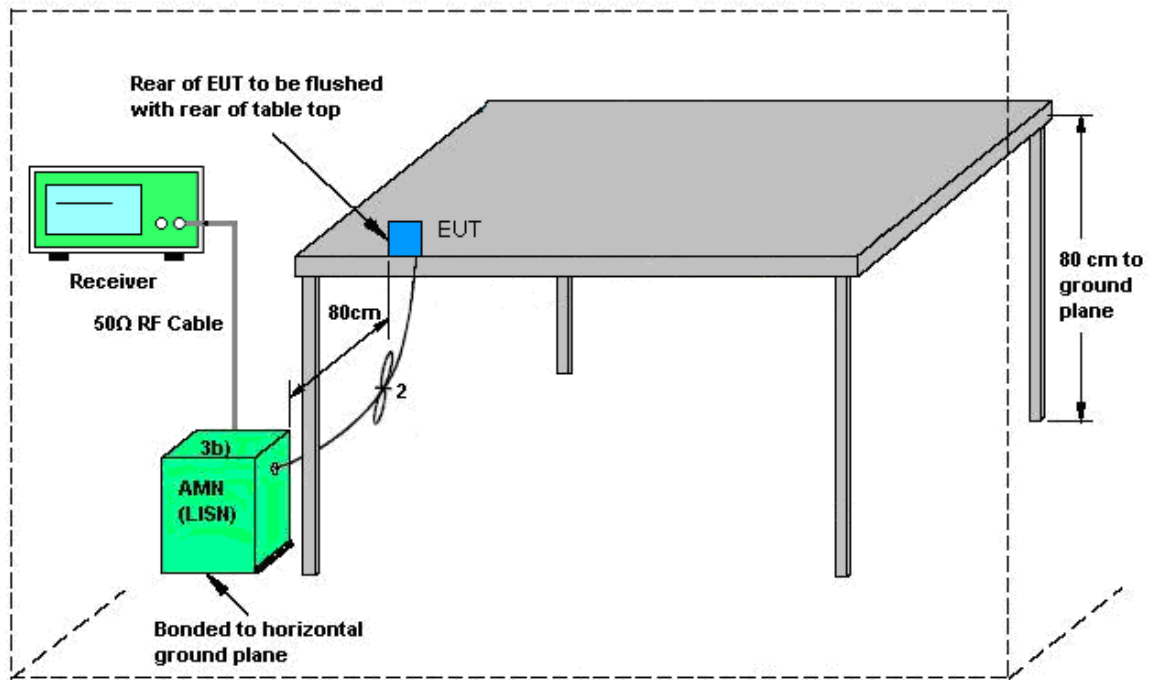
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedure

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

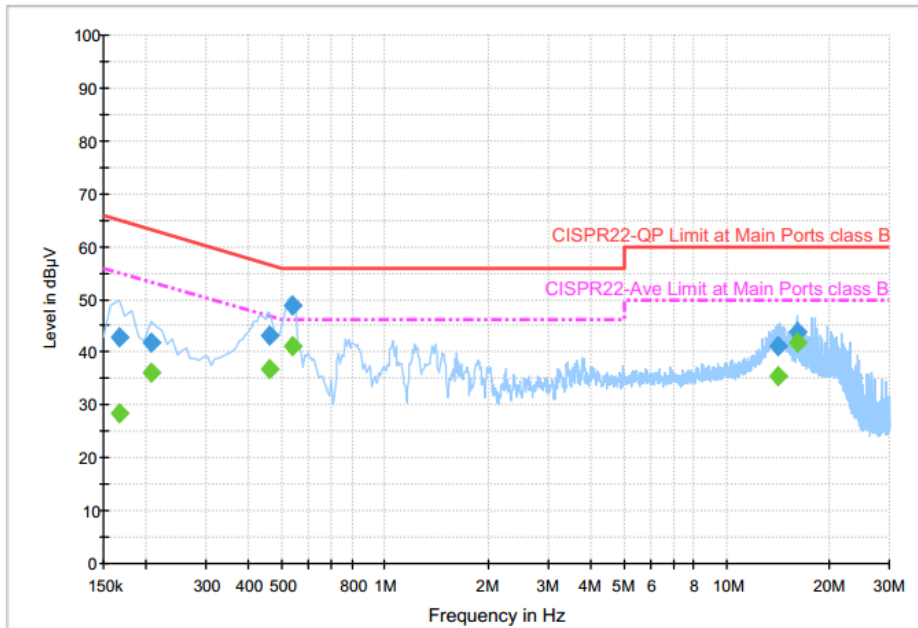
3.1.4 Test Setup



AMN = Artificial mains network (LISN)
 AE = Associated equipment
 EUT = Equipment under test
 ISN = Impedance stabilization network

3.1.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	21~23°C
Test Engineer :	Derreck Chen	Relative Humidity :	48~50%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	Bluetooth Idle + WLAN Idle + LAN Link + PoE Link + USB Cable (Data Link with Notebook) + Earphone + VOIP		



Final Result : Quasi-Peak

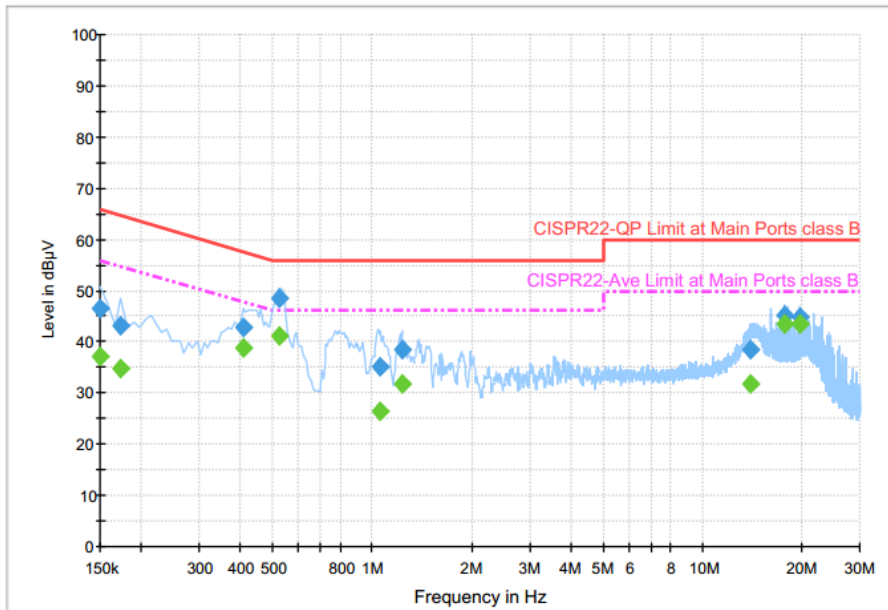
Frequency (MHz)	Quasi-Peak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.166000	42.7	Off	L1	19.6	22.5	65.2
0.206000	41.8	Off	L1	19.6	21.6	63.4
0.462000	43.2	Off	L1	19.6	13.5	56.7
0.534000	48.9	Off	L1	19.6	7.1	56.0
14.150000	41.1	Off	L1	19.8	18.9	60.0
16.230000	44.0	Off	L1	19.8	16.0	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.166000	28.3	Off	L1	19.6	26.9	55.2
0.206000	36.1	Off	L1	19.6	17.3	53.4
0.462000	36.8	Off	L1	19.6	9.9	46.7
0.534000	41.2	Off	L1	19.6	4.8	46.0
14.150000	35.4	Off	L1	19.8	14.6	50.0
16.230000	41.9	Off	L1	19.8	8.1	50.0



Test Mode :	Mode 1	Temperature :	21~23°C
Test Engineer :	Derreck Chen	Relative Humidity :	48~50%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Bluetooth Idle + WLAN Idle + LAN Link + PoE Link + USB Cable (Data Link with Notebook) + Earphone + VOIP		



Final Result : Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	46.5	Off	N	19.6	19.5	66.0
0.174000	43.3	Off	N	19.6	21.5	64.8
0.406000	42.9	Off	N	19.6	14.8	57.7
0.526000	48.5	Off	N	19.6	7.5	56.0
1.062000	35.3	Off	N	19.6	20.7	56.0
1.230000	38.4	Off	N	19.6	17.6	56.0
14.062000	38.4	Off	N	19.9	21.6	60.0
17.694000	45.0	Off	N	19.9	15.0	60.0
19.710000	44.8	Off	N	20.0	15.2	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	37.2	Off	N	19.6	18.8	56.0
0.174000	34.6	Off	N	19.6	20.2	54.8
0.406000	38.8	Off	N	19.6	8.9	47.7
0.526000	41.2	Off	N	19.6	4.8	46.0
1.062000	26.3	Off	N	19.6	19.7	46.0
1.230000	31.8	Off	N	19.6	14.2	46.0
14.062000	31.7	Off	N	19.9	18.3	50.0
17.694000	43.5	Off	N	19.9	6.5	50.0
19.710000	43.4	Off	N	20.0	6.6	50.0



3.2. Test of Radiated Emission Measurement

3.2.1. Limit of Radiated Emission

The emissions from an unintentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.2.2. Measuring Instruments

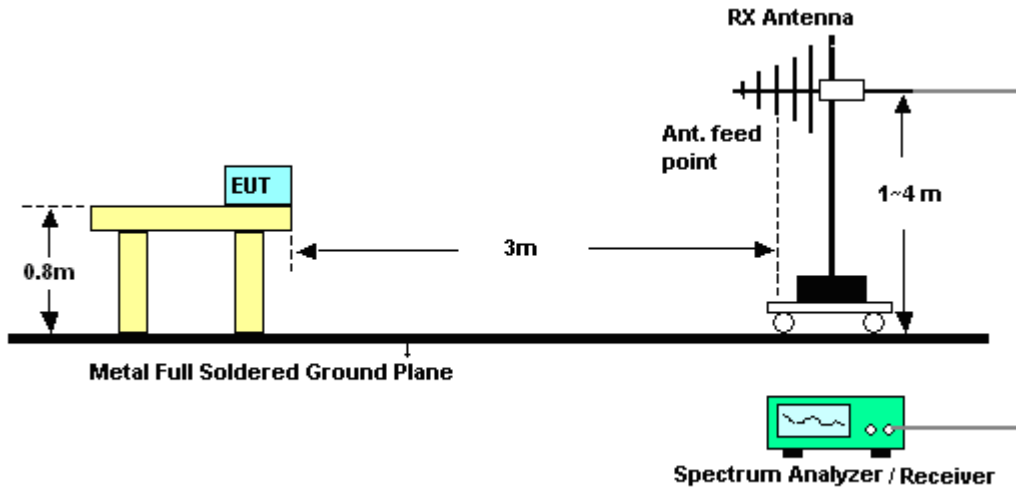
The measuring equipment is listed in the section 4 of this test report.

3.2.3. Test Procedures

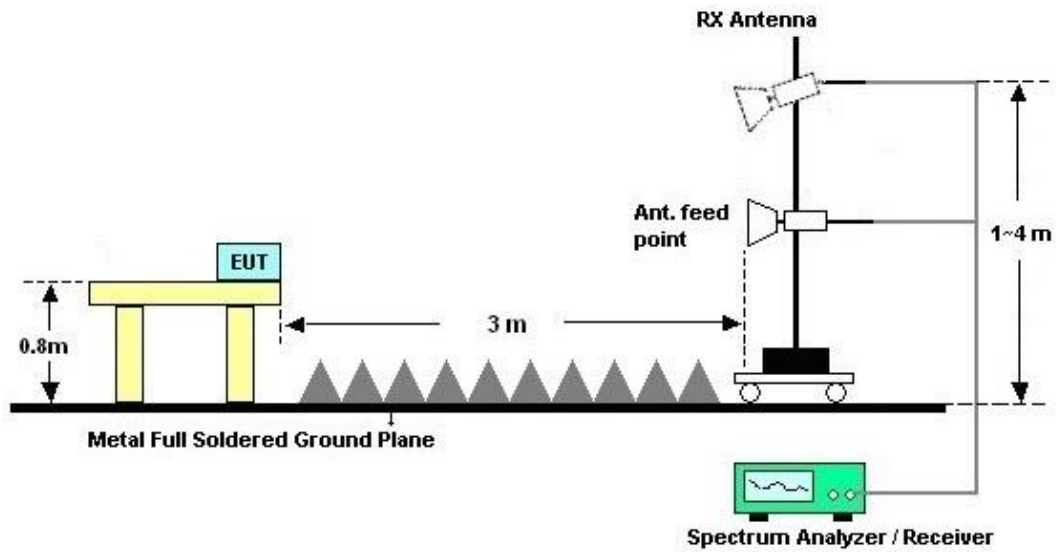
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120kHz/VBW=300kHz for frequency below 1GHz; RBW=1MHz VBW=3MHz (Peak), RBW=1MHz/VBW=10Hz (Average) for frequency above 1GHz).
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.
8. Emission level (dBµV/m) = 20 log Emission level (µV/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

3.2.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz



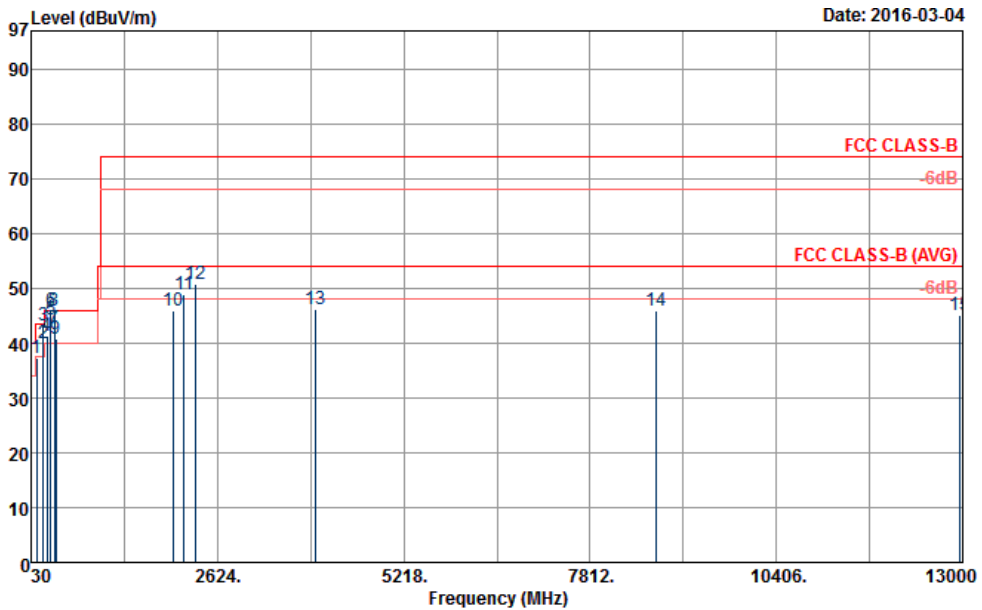
For radiated emissions above 1GHz





3.2.5. Test Result of Radiated Emission

Test Mode :	Mode 2	Temperature :	21~22°C
Test Engineer :	Donny Tang	Relative Humidity :	42~46%
Test Distance :	3m	Polarization :	Horizontal
Function Type :	Bluetooth Idle + WLAN Idle + LAN Link + PoE Link + USB Cable (Data Link with Notebook) + Earphone + MPEG4		

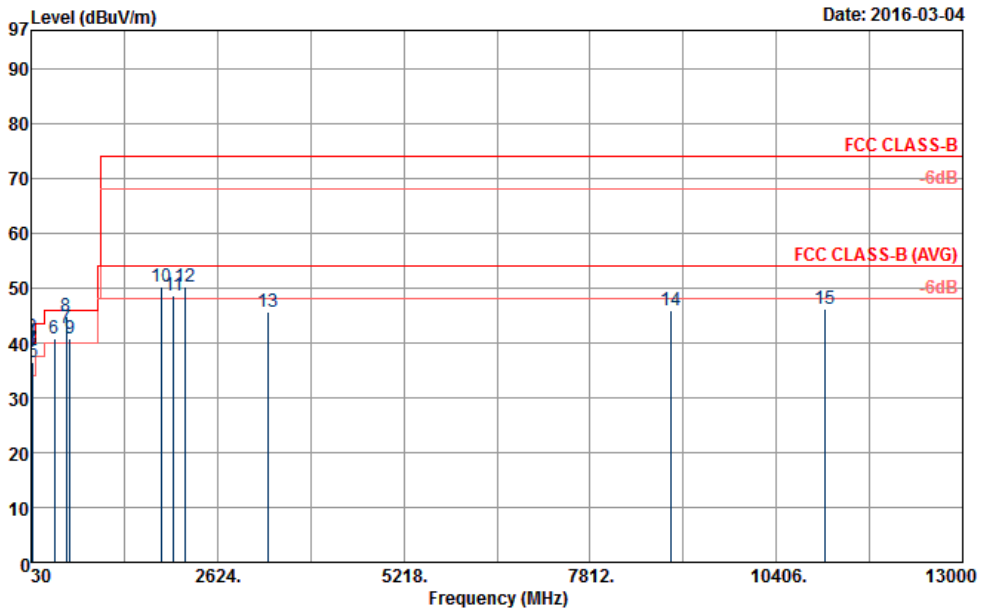


Site : 03CH06-HY
 Condition : FCC CLASS-B 3m 9120D_1156_150827 HORIZONTAL
 Project : 612211
 Power : POE
 Mode : Mode 2
 : #6 Sample

	Freq	Level	Over Limit	Limit Line	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark	
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	105.87	37.27	-6.23	43.50	50.26	16.72	2.02	31.73	---	---	Peak
2	200.10	40.01	-3.49	43.50	53.90	15.90	1.94	31.73	100	55	QP
3	200.10	43.31	-0.19	43.50	57.20	15.90	1.94	31.73	100	55	Peak
4	250.05	41.29	-4.71	46.00	52.10	18.70	2.21	31.72	---	---	Peak
5	300.00	44.18	-1.82	46.00	54.10	19.50	2.28	31.70	103	60	QP
6	300.00	45.88	-0.12	46.00	55.80	19.50	2.28	31.70	103	60	Peak
7	349.70	42.79	-3.21	46.00	51.20	21.10	2.24	31.75	109	37	QP
8	349.70	45.89	-0.11	46.00	54.30	21.10	2.24	31.75	109	37	Peak
9	374.90	40.76	-5.24	46.00	48.44	21.71	2.38	31.77	---	---	Peak
10	2000.00	45.91	-28.09	74.00	73.72	26.30	6.39	60.50	---	---	Peak
11	2164.00	48.77	-25.23	74.00	76.12	26.64	6.51	60.50	---	---	Peak
12	2318.00	50.81	-23.19	74.00	77.62	27.02	6.67	60.50	100	203	Peak
13	3998.00	46.08	-27.92	74.00	67.87	29.70	10.01	61.50	---	---	Peak
14	8732.00	45.92	-28.08	74.00	54.12	37.27	14.35	59.82	---	---	Peak
15	12962.00	45.17	-28.83	74.00	51.42	39.24	14.68	60.17	---	---	Peak



Test Mode :	Mode 2	Temperature :	21~22°C
Test Engineer :	Donny Tang	Relative Humidity :	42~46%
Test Distance :	3m	Polarization :	Vertical
Function Type :	Bluetooth Idle + WLAN Idle + LAN Link + PoE Link + USB Cable (Data Link with Notebook) + Earphone + MPEG4		



Site : 03CH06-HY
 Condition : FCC CLASS-B 3m 9120D_1156_150827 VERTICAL
 Project : 612211
 Power : POE
 Mode : Mode 2
 : #6 Sample

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark	
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg		
1	33.24	38.37	-1.63	40.00	44.22	24.02	1.91	31.78	105	7 QP	
2 *	33.24	41.06	1.06	40.00	46.91	24.02	1.91	31.78	105	7 Peak	
3	39.99	38.80	-1.20	40.00	48.80	20.00	1.78	31.78	100	131 QP	
4 *	39.99	40.20	0.20	40.00	50.20	20.00	1.78	31.78	100	131 Peak	
5	52.95	36.35	-3.65	40.00	52.10	13.86	2.17	31.78	---	---	Peak
6	349.70	40.77	-5.23	46.00	49.18	21.10	2.24	31.75	---	---	Peak
7	524.70	42.64	-3.36	46.00	47.02	24.54	3.04	31.96	100	63 QP	
8	524.70	44.92	-1.08	46.00	49.30	24.54	3.04	31.96	100	63 Peak	
9	575.10	40.71	-5.29	46.00	44.32	25.30	3.14	32.05	---	---	Peak
10	1850.00	50.16	-23.84	74.00	78.50	26.09	6.07	60.50	---	---	Peak
11	2010.00	48.68	-25.32	74.00	76.49	26.30	6.39	60.50	---	---	Peak
12	2184.00	50.24	-23.76	74.00	77.51	26.72	6.51	60.50	100	201 Peak	
13	3332.00	45.79	-28.21	74.00	70.23	28.63	8.09	61.16	---	---	Peak
14	8938.00	45.95	-28.05	74.00	54.38	37.59	14.16	60.18	---	---	Peak
15	11078.00	46.29	-27.71	74.00	49.61	40.45	15.21	58.98	---	---	Peak



4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Feb. 22, 2016	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9kHz~7GHz	Aug. 26, 2015	Feb. 22, 2016	Aug. 25, 2016	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 02, 2015	Feb. 22, 2016	Dec. 01, 2016	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 08, 2016	Feb. 22, 2016	Jan. 07, 2017	Conduction (CO05-HY)
Bilog Antenna	Schaffner	CBL6111C	2725	30MHz~1GHz	Nov. 17, 2015	Mar. 04, 2016	Nov. 16, 2016	Radiation (03CH06-HY)
EMI Test Receiver	Rohde & Schwarz	ESU26	100472	20Hz~26.5GHz	Jan. 07, 2016	Mar. 04, 2016	Jan. 06, 2017	Radiation (03CH06-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1156	1GHz~18GHz	Aug. 21, 2015	Mar. 04, 2016	Aug. 20, 2016	Radiation (03CH06-HY)
Preamplifier	SONOMA	310N	186713	9kHz~1GHz	Apr. 20, 2015	Mar. 04, 2016	Apr. 19, 2016	Radiation (03CH06-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1850117	1GHz ~ 18GHz	Jul. 01, 2015	Mar. 04, 2016	Jun. 30, 2016	Radiation (03CH06-HY)
Antenna Mast	MF	MF-7802	MF78020821 2	1m~4m	N/A	Mar. 04, 2016	N/A	Radiation (03CH06-HY)
Turn Table	INN-CO	DS2000	420/650/00	0-360 degree	N/A	Mar. 04, 2016	N/A	Radiation (03CH06-HY)



5. Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.7
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.0
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